

French-German Summer School  
*Galois Theory and Number Theory*  
Konstanz, July 18-24 2015

Statistical number theory in function fields – Sums of two  
squares

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*Abstract:* The starting point of this talk is Landaus theorem: The number of sums of two squares up to  $x$  is about  $K \frac{x}{\sqrt{\log x}}$ , where  $K > 0$  is the Landau-Ramanujan constant. We will discuss the function field analogue of Landaus theorem, and will report on recent developments on function field versions of some classical open problems in this theory.